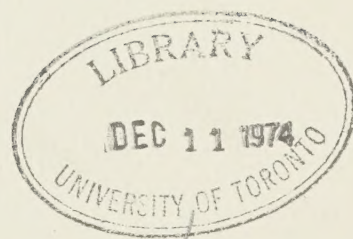


**TOWARDS A LAND USE PLAN FOR HALDIMAND NORFOLK**

CA20N  
MA65  
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Publications



MARCH 1970



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March 17, 1970.

The Members of the Haldimand-Norfolk  
Joint Study Committee

The County and Municipal Councils  
and Planning Boards of  
Haldimand and Norfolk

The Citizens of Haldimand and  
Norfolk Counties

Ladies and Gentlemen:

This report is not a statement of Government policy. However, it is in harmony with the overall position paper "A Strategy for South-Western Ontario Development", and also in substantial agreement with the Government's development concepts for the Niagara and Lake Erie Regions as these have been expressed internally in interdepartmental discussion. The report is a summary of the information and statistical forecasts so far available from the work of the Haldimand-Norfolk Study group. It also presents the general approach of the group, as far as it has been formulated, to the development of a plan for Haldimand-Norfolk. The material in the report has been reviewed and commented upon by a number of Government departments, but none of it implies any commitment by the Government to a particular policy or program.

The report is presented to you for your information, and in the hope that it will help you to help us in continuing our work. We need your reactions, opinions and ideas.

Respectfully submitted,

N. H. Richardson,  
Study Director.

NHR/alr





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".....Rapid overall growth will itself generate new and intensified problems. Some of these are associated with the swift, uneven, and frequently unanticipated processes of change that are the hallmark of economic expansion. Others reflect the fact that under such conditions, human wants and aspirations tend to be high, demanding and growing. Rising prosperity generates new desires, new preferences and a growing awareness of the disadvantages and inequities suffered by some people. Expectations escalate sharply. Demands on economic resources intensify. Choices and options are widened, and in many ways it becomes more, rather than less, difficult to determine priorities among many competing claims, and to match available resources to such priorities. Obviously the challenges to Canadian decision-makers will be very great."

Perspective 1975

Sixth Annual Review of  
the Economic Council of  
Canada  
September 1969.



## SUMMARY AND STATEMENT OF BASIC PRINCIPLES

The new plant of the Steel Company of Canada near Nanticoke, together with the Ontario Hydro generating station and other industrial growth, will increase the population of the Haldimand-Norfolk Study Area from just over 80,000 at present to some 283,000 by the year 2001. The non-farm population will increase by 209,000 in that time.

The existing urban communities in the Study Area will be able to accommodate only three or four years' growth on their present water supply and sewage systems. With substantial investment in improvements to services, sufficient additional capacity could be provided in two of these towns to meet growth needs for perhaps another five years at most. Thus, before 1981 at latest, and preferably by 1974, an entirely new system of services to provide for large-scale urban growth will be needed. Planning for such a system must therefore start in the near future.

Planning for urban growth must take account of the strong possibility that its pace will be greatly accelerated if -- as seems very likely -- the trend towards large-scale industrialisation continues. The acquisition of a large tract of land just to the west of the Study Area by the Dominion Foundries and Steel Company and the plans of Texaco Canada Ltd. to build an oil refinery near Nanticoke support the likelihood of this. Thus, the planning of the Study Area must provide for sufficient built-in flexibility to allow for much greater population increases than it is now possible to forecast.

The following is an outline of a possible urban growth strategy for the Study Area.

### Period I      (1969 - 1975)

- (i)      Expansion of existing communities, basically on present services, with some improvements.
- (ii)     Construction of a regional water supply system in the central sector of the Study Area.

### Period II     (1976 - 1980)

- (i)      If necessary, pending completion of an area-wide water supply system, concentration of growth as an interim measure on one or more communities (e.g., Simcoe) where local services can be expanded.
- (ii)     Initiation of development of a major new urban centre within the Study Area.



- (iii) Initiation of planned distribution of growth to other communities, in relation to (i) and (ii), as far as availability of services will permit.

Period III (1981 - 2000)

- (i) Continued development of the new major urban centre with concentration of principal area facilities and community services.
- (ii) Continued growth of selected existing communities with the objective of creating a balanced "hierarchy" of urban centres.
- (iii) Initiation of an appropriate development strategy in the western Norfolk/eastern Elgin/south Oxford area to accommodate growth arising from Dofasco.

In developing this strategy and in preparing a detailed plan for land use and transportation for the Study Area, full account should be taken of the regional goals for southwestern Ontario as set out in the Government statement on "A Strategy for South-Western Ontario Development" to the extent to which they are applicable in Haldimand-Norfolk:

- "1. A form of development which combines regional economic diversification with industrial specialization in sub-regional zones and improves community social balance through diversified regional employment opportunities.
- "2. A distribution of economic growth opportunities for private industry which provides employment within commuting range of all parts of the four southwestern Ontario regions.
- "3. A nodalized decentralization of urban growth which avoids unsightly and uneconomic sprawl or strip linear development, but rather, builds upon existing centres' capacity for growth, and distributes this growth among a large enough number of centres to retain a human scale in the size of future communities, thus ensuring economies of scale without the diseconomies of congestion.
- "4. A transportation system which shapes the pattern of future urban growth as a deliberate instrument of long-term development policy, provides community residents with easy commuting access to a variety of nearby employment, cultural and service centres, and provides employers with the ready availability of an expanded and diversely skilled labour market, significantly larger than that of any single community.

- "5. An environmental protection which, while accommodating population growth, ensures the economic provision of water and sewer services along multiple-service corridors, and protects the future use of the regions' strategic waterfront and escarpment recreation lands and prime farm soils.
- "6. A flexibility in planning which recognizes the many unpredictable elements in future technology, modes of transportation, industrial location and personal life style and maintains the region's capacity to accommodate such changes; a realism which utilizes the existing hierarchy of urban centres for economic distribution of public services, but acknowledges the variability in individual community growth which can never be precisely predicted.
- "7. A pattern of partnership in planning which encourages local participation in each critical stage of the planning process and ensures that resulting action programs reflect an amalgam of local municipal, county, regional and Provincial viewpoints."

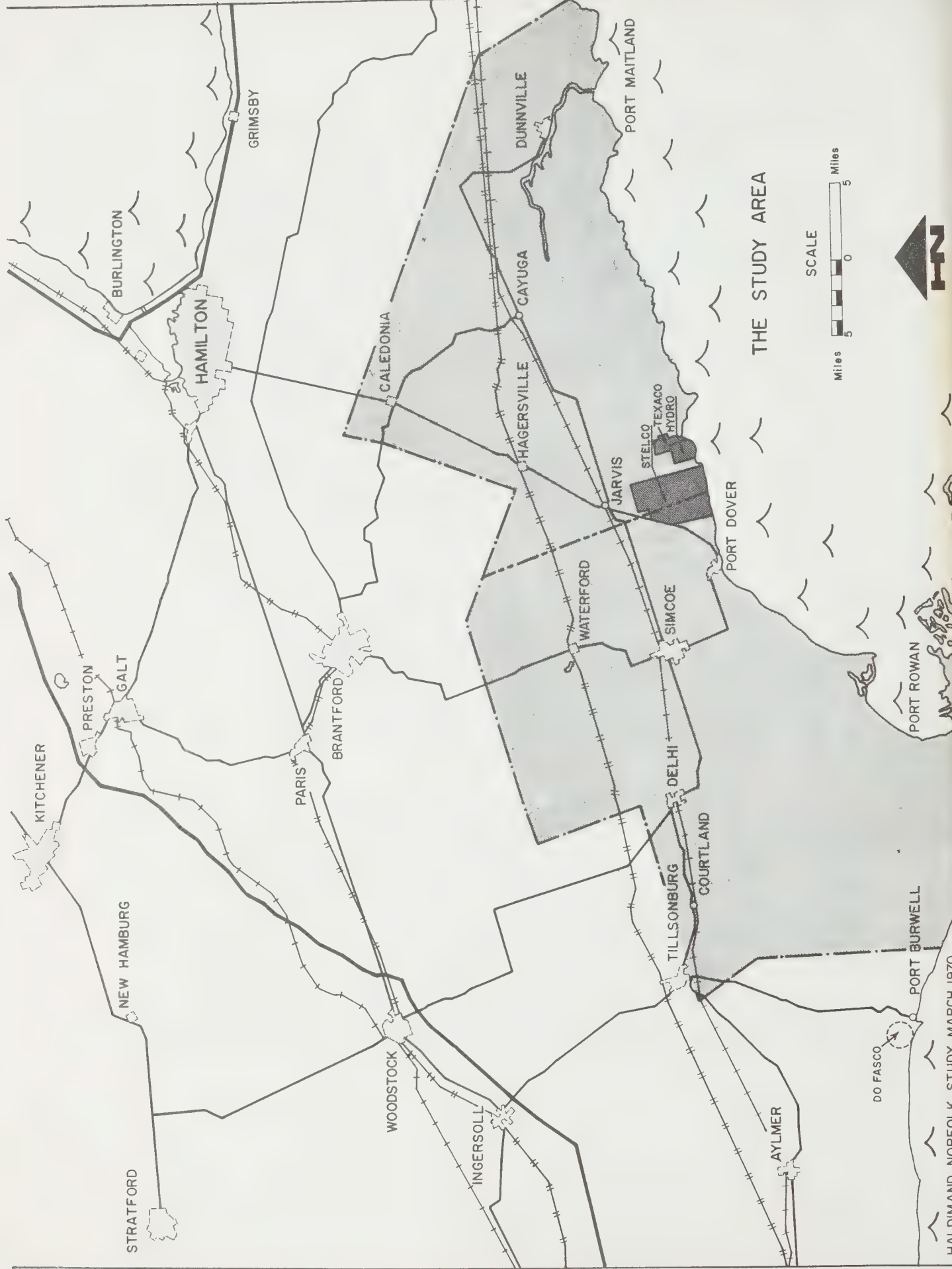
## 1. Introduction

The first report (November, 1969) in this series produced by the Haldimand-Norfolk Study group was intended for, and confined to, distribution within the Government of Ontario in order to secure the views of the various Government departments on the information, forecasts and preliminary thinking developed by the Study group, and to ensure that there was no conflict with the policies, plans and programs of those departments. This report includes all the statistical information and forecasts, and most of the remaining material, included in the 1969 report, revised, supplemented and brought up to date on the basis of the comments and information received and of further work by the Study group itself.

Both reports recommend that a major new urban centre be created within the Study Area to accommodate a large proportion of the population growth expected to be caused by industrial development in the Nanticoke area. In the 1969 report, three sectors of the Study Area were suggested as being possibly suitable for the new centre. It is considered to be still premature to disclose these alternative locations publicly, and therefore they are not identified in this report. However, the various considerations and criteria which were taken into account in arriving at the three alternatives are presented and discussed. Thus, the Joint Study Committee and all others concerned have the opportunity to review the principles and reasoning involved, to arrive at their own conclusions, and to convey them to the Study group and have them taken fully into account before any final recommendations are arrived at.

This report is in accordance with the Government's statement on "A Strategy for South-Western Ontario Development", which sets out the general development framework within which a plan for Haldimand-Norfolk will take shape. As work on the plan continues, it will be related to the broader plans for the Niagara and Lake Erie Economic Regions which are emerging from the regional development program of the Department of Treasury and Economics under the coordination of the Advisory Committee on Regional Development. Thus the plan for Haldimand-Norfolk will form an integral part of a broader regional development policy for central south-western Ontario, adopted by the Provincial Government and implemented through the programs of its departments.





THE STUDY AREA



## 2. Meeting the Immediate Needs

Between the present and 1976 the net increase in employment will probably amount to some 9,000, mostly generated by new industrial growth (see Table 1). However, this is not likely to have as large an impact on the population of the Study Area as may at first appear, for the following reasons:

(i) It is reasonable to assume that many of these workers will be recruited from among people already resident in the Study Area. About 15% of the total labour force in Haldimand and Norfolk Counties are currently employed outside the two Counties (mainly in Hamilton, Brantford and Welland). In view of Stelco's wage structure, many of these, as well as workers in existing local industries, can be expected to be "stolen" by Stelco. (For this reason the advent of Stelco is likely to be a source of problems for local industries.) The agricultural labour force, which is in any case declining, can be expected to provide another source of industrial workers, although limited by lack of appropriate training.

(ii) It is also reasonable to assume that of the workers who are transferred by Stelco or recruited outside the Study Area, a high proportion will commute from the Hamilton area or elsewhere, at least for a time.

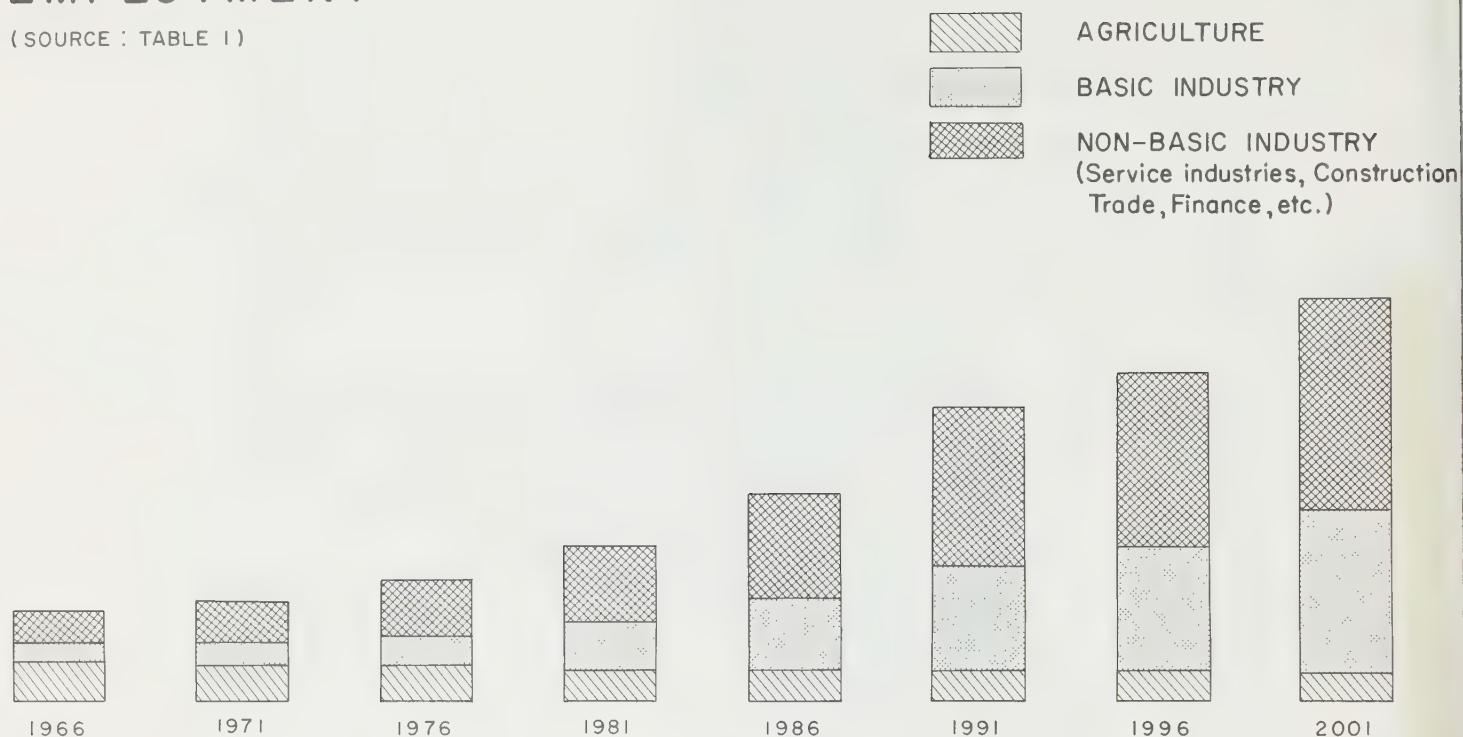
(iii) Not all the labour force will consist of household heads. As much as 24% may be made up of members of households whose heads are already included in the labour force.

Considering these three factors, it would be generous to assume that the number of new non-farm households moving into the Study Area by 1976 as a result of industrial growth would amount to more than 4,800, representing a population increase of about 13,000. The figure could, in fact, be much lower (see Table 2).

During the period 1976-1980, non-farm employment will increase substantially, but by no means astronomically. By 1981, Stelco, Hydro and other basic industries may employ perhaps 13,000 workers, an increase of 5,000 over 1976. The increase in employment in construction and in other non-basic industries will amount to another 5,000 in this period. Probably a high proportion of the new employees will be in-migrants, as the available local labour force gets absorbed, and workers will be tending gradually to relocate near their

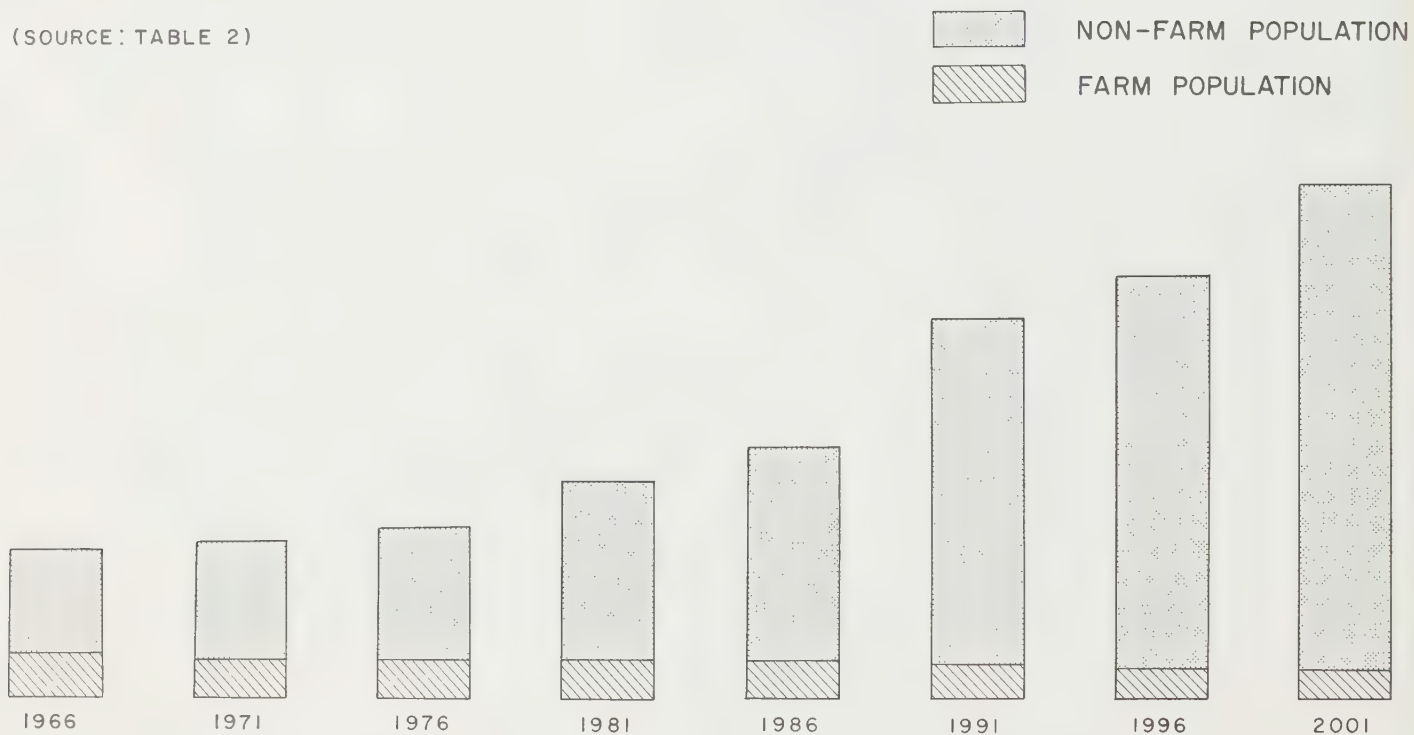
# EMPLOYMENT

(SOURCE : TABLE 1)



# POPULATION

(SOURCE : TABLE 2)





jobs over this period. The total number of new households will probably be about 6,500, representing a population increase of about 25,000 over 1976 (see Table 2). (These figures might have to be revised upwards substantially if Dominion Foundries and Steel Company develops its new site at Port Burwell earlier than presently anticipated.)

The two counties are thus facing the prospect of a population increase of nearly 50% in the next ten years. While most of this increase will come after 1976, the non-farm population growth anticipated even in the short term is substantial in relation to the size of the existing urban centres. The immediate problem therefore relates to the ability of existing communities within the Study Area to accommodate new growth during the interim period while an area-wide plan is being prepared and measures to put it into effect are initiated. Table 3 summarizes local growth capacities as determined by existing and planned water and sewer services.

All the incorporated urban areas (towns and villages) within the two counties are within 35 minutes' commuting time (generally regarded as the acceptable maximum) of the Stelco site, using the existing road system (though some, such as Dunnville, Delhi and Port Rowan, are close to the outside limit). Reference to Table 3 shows that these municipalities can accommodate a total population increment of 3,700 on their existing servicing systems (including facilities now planned or under construction). Port Dover has sufficient capacity for an additional 2,400 people; Cayuga and Jarvis, 500 each; Hagersville, 300. None of the other communities has any excess capacity at present, and Cayuga, Jarvis and Port Dover would all require new or revised planning controls as a prerequisite to growth up to the capacity of their service systems.

Thus, the existing growth capacity is substantially lower than the total 1966-1976 population increase (13,000). However, some of this growth has occurred already. This is estimated to amount to some 4,000 people, already provided for by existing services. A relatively large increase in employment and population is anticipated towards the end of the period 1966-1976, after the new steel plant starts operation, probably in 1974. Thus, in the period between 1970 and 1974, the population increase may not amount to more than 6,000. While this is still well over the present servicing capacity of the existing communities, the following considerations must be taken into account:

(i) A limited amount of growth could be accommodated in hamlets and rural areas.

(ii) It is reasonable to assume that new servicing programs -- e.g., in Simcoe -- will increase the capacity of some communities before 1974.

(iii) There is a possibility that some of the immediate demand for housing may be met by the provision of temporary housing for construction workers.

On this basis, it seems feasible to pursue a policy of confining new development to the existing towns for the next three or four years, provided that planning controls are adopted or amended as necessary, and that some servicing improvements are made.

It is clear, however, that this policy will only serve as a stopgap. It will quickly bring every town within commuting distance of Stelco, except Cayuga, Port Dover and Simcoe, to the saturation limit set by available water sources or by the capacity of receiving streams to absorb sewage effluent, and continued growth of Cayuga, Port Dover and Simcoe would entail major expenditures on new servicing facilities. Also, in view of the limits to growth set by the availability of services, the demand for housing would soon start to push land and house costs up very rapidly. Therefore, consideration must be given immediately to the provision of some reserve capacity for post-1974 growth, to tide over possible delays in the provision of large-scale (area-wide) servicing systems.

The five possible candidates for the provision of such reserve capacity are Cayuga, Dunnville, Port Dover, Port Rowan and Simcoe, none of which is nearing the ceiling imposed on other towns, either by the quantities of water available from present sources, or by the capacity of receiving streams to receive sewage effluent.

In Cayuga, a pollution control facility now being considered should provide adequate treatment for a population of 1,850 by 1975, but the present water supply system is considered by the Ontario Water Resources Commission to be adequate only for a population of 1,500. The village's ability to finance an improved system in addition to expanded sewage treatment facilities is doubtful.

The Dunnville water treatment plant will require expansion to serve any further population growth, and as in

the case of Cayuga, Dunnville's ability to finance such works in addition to the sewage treatment plant now under construction is doubtful. Also, Dunnville is at the extreme edge of the Stelco commuting radius.

Port Dover has substantial excess capacity in both water and sewage treatment plants due to the closing of two fish processing plants, though improvements in the sewerage and/or water distribution systems may be required.

Simcoe is presently considering expansion of its sewage treatment plant to provide the capacity for approximately 10,000 additional population, for which the present water supply system is already adequate.

This brief review indicates that Simcoe and Port Dover are the only communities likely to be in a good position to accommodate substantial continuing growth after 1974. Between them, they may be able to absorb an additional population of between 13,000 and 14,000. This is, however, only half the anticipated growth in non-farm population in the Study Area between 1974 and 1980. It is therefore clear that the indicated servicing improvements in the two towns will in themselves provide only a short breathing-spell after 1974, and that well before 1981 there will be a pressing and inescapable need for radically expanded water and sewer services to be in operation, probably on a regional or sub-regional scale.

In summary:

1. Population growth arising from industrial construction in the Study Area can probably just -- but only just -- be accommodated, until the Stelco plant is in production in 1974, on servicing systems now in existence, under construction, or planned.
2. It is therefore unnecessary to permit large-scale development, away from existing communities and making use of essentially new servicing systems, before a general plan is completed and its implications for services evaluated. In order to minimize restrictions on long-range planning choices, it would also be extremely desirable to avoid commitments to extensions to existing communities of a scale large enough to create significant changes in the existing structure of urban settlement or services.
3. On the other hand, everything possible should be done to assist the communities within commuting range of Nanti-



coke to expand the capacities of their present servicing systems as far as their financial positions permit. This applies particularly to Simcoe and Port Dover, which will probably have to accommodate most new growth over the next three to five years.

4. Possibly by 1975, and almost certainly not later than 1978, the urban population will have grown to the point where very large new water and sewage works will be required to service it. Planning for such works should therefore either accompany, or follow very closely upon, the preparation of the general area plan.

### 3. The Basis of a Land Use Plan

#### 3.1 The Future Perspective

In section 2, population growth and urban development during the period to 1974 were examined from a purely pragmatic point of view, mainly in order to establish whether they can be accommodated by existing communities while long-range policies and programs for the Study Area are formulated and their implementation initiated. The scale of long-term growth in relation to the scale of the present urban centres is such, however, that the pattern of physical development and land use must very soon begin to be governed by a specific plan for the whole area, fitting into the South-Western Strategy and the regional development plans, rather than by short-term expediency.

It is assumed that by the year 2001 the Dofasco development will be in progress and that the scale will be comparable with that of Stelco, but with a 15-year time lag. For the purposes of this report, it is also assumed that the full impact of this development in its initial stages will fall within the Study Area. As a result, the labour force in the area would reach some 109,000, generating a non-farm population of 267,000, representing a total population increase of at least 200,000 over 1966; i.e., a total population of the order of 280-300,000 (see Tables 1 and 2). These figures could be substantially altered by factors which cannot now be predicted, such as higher levels of automation or major changes in the world steel market. They might also be affected by new regional planning policies. But on the basis of the information now available, it seems probable that if anything the estimates are likely to prove too low rather than too high, if we make the reasonable assumption that the new trends in industrial development will continue -- an assumption supported by the recent announcement by Texaco Canada Ltd. of its plans to build an oil refinery adjacent to the Ontario Hydro site.

To provide a general perspective for long-range planning for Haldimand-Norfolk, it is useful to consider the coming years as falling into three broad time-periods or development phases: a "period of awakening"; a "period of early development", during which special problems will be encountered; and a "period of maturity".

#### Period of Awakening (1969-1974)

This is the present stage, when the first significant evidence of change is beginning to show. Assembly of

land by private developers has begun, starting a rising spiral of land and housing costs, creating economic problems for the farmer, and reducing the tax base by removing improvements and taking land out of production, thus increasing the burden on local taxpayers.

This period is characterised by uncertainty and exaggerated expectations for the future. Financial compensations for the community are nil, but some individuals secure substantial financial gains -- or expect to be able to do so -- bringing about a clash between private and public interest.

No new burden of public expenditure is created, but taxes tend to rise nevertheless.

Some characteristics of this phase carry over into later periods, but become less dominant.

#### Period of Early Development (1975-1990)

Extensive and swift urbanisation of an area of farms and small towns will require the rapid creation of an almost totally new urban infrastructure. The volume of growth does not in itself create the problem, but rather its scale in relation to the size and rate of growth of existing urban centres: the smaller the tax base, the more difficult it is to assume additional burdens. The problem lies in the inability to strike a balance between the tax revenues and the additional expenditures arising out of new growth. Regardless of what area growth concept is finally adopted, it will impose heavy demands on all resources. This demand will be experienced at a time of rapid growth in the Canadian economy, with resultant strong competition for limited resources, public and private. In particular, the current high cost of capital could have grave implications.

To illustrate the magnitude of expenditures that will be required, it must be understood that apart from the piped services, roads and community facilities normally required in older Canadian cities, provision will have to be made for an unusually young population with consequent heavy demands for schools, larger-than-average dwellings, sports facilities, etc.; in other words, substantially more social capital per taxpayer than in older cities.

Development in the Study Area will be a continuous process for many years to come. The requirements for added facilities will grow correspondingly. The need for further investments will become apparent before existing facilities



# GROWTH: PROBLEMS: POLICIES:

	PHASES OF URBAN GROWTH	MAJOR PROBLEMS	POLICIES
PRIOR TO 1970	<p>MAJOR INDUSTRIES MOVING IN:</p> <p>ONT. HYDRO STELCO TEXACO</p>	<p>PRE-INDUSTRIAL ECONOMY</p> <p>LOW INCOMES IN HALDIMAND</p> <p>LAKE ERIE DETERIORATING</p>	
1970	<p>Expansion of existing communities based on service capacity.</p> <p>Initiation of new water supply system.</p>	<p>Land assembly. Housing.</p> <p>Diminishing tax base.</p> <p>Increasing farm tax load.</p>	?
1980	<p>Expansion of selected communities.</p> <p>Initiation of new urban concentration.</p>	<p>Financing of large-scale investment in urban services and facilities.</p>	?
1990	<p>Emphasis on development of new urban concentration.</p> <p>Planned expansion of other communities to form an area wide system of "urban places."</p>		
2000	<p>Initiation of growth related to Dofasco.</p>	<p>New cycle related to Dofasco.</p>	?

have been paid for. Should resources not be available, a freeze on development would be the only possible course of action in order to catch up on the public facilities required by the development already in existence. The only alternatives would be either inferior community facilities, or bankruptcy. Neither of these is acceptable, and either would prevent or retard continuing growth.

#### Period of Maturity (1991- )

This stage is reached once there exists an adequate taxation base with a relatively sound capacity to provide for additional social investments. By this time the special financial arrangements made to facilitate development will no longer be needed. The development has matured: it no longer suffers from growing pains.

### 3.2 Urban Growth

By the end of this century, the Study Area will experience an increase in its urban population of roughly 210,000 (see Table 2). This increase is equivalent to a city as large as London, Ontario. Such an influx of population could be accommodated in two ways. One way would be to distribute urban growth more or less evenly among the ten towns and villages in the two Counties, so that each would grow to a population of between 20,000 and 30,000. This course of action would have the obvious appeal of being "fair", but in practical terms there are several serious objections to it. First, the existing communities are scattered at various distances from the centre of employment, from Jarvis and Port Dover about five miles away to Port Rowan and Dunnville over 20 miles away. This means, among other things, that extremely rigid planning controls would be needed to maintain an even distribution of population. Second, such a dispersion of urban centres would be likely to result in serious problems and diseconomies in planning and building the area-wide servicing systems which will be needed for the increasing urban population. Third, such dispersion would prevent the emergence of a single urban centre large enough to provide a wide range of well-developed personal and community services (e.g., retail, professional, cultural, recreational, etc.) from which the whole area would be able to benefit.

The second alternative is to concentrate a large proportion of the new urban growth in a single location, either using an existing community as the base or building anew on land now undeveloped, thus creating a "new town" or new "growth point" as the dominant urban centre in the Study Area. In contrast to the first alternative, this has a num-

ber of probable advantages. The provision of piped services is likely to be more economical. There will be a greater diversification of the economic base. There will be a wider range of commercial, professional and other services. From a general social standpoint, the range of opportunities will be wider. A single strong service centre will be of greater benefit to its region than several relatively small centres providing a limited range of services. In terms of planning and development strategy, a greater return and a greater impact are likely to accrue from the concentration of effort in one place. Finally, a single major centre can establish an identity and role for itself without disturbing the legitimate established functions and identity of smaller service centres. In other words, where ten towns of roughly equal size would simply be competing with each other, a single large centre, together with a number of smaller centres of varying sizes, would serve complementary functions.

The second course of action therefore seems clearly superior to the first, and it is recommended as the basis of an urban growth strategy for the Study Area.

In considering this recommendation it is most important that three facts should be kept in mind. First, the "concentration" or "growth point" strategy does not imply that the expansion of other urban centres need or should be stopped. On the contrary, it assumes that well over 100,000 people would be accommodated by expansion of the existing communities, leaving perhaps 120,000 population to be housed in a new, major centre by the end of the century. The new centre should be regarded as the focal point of a "hierarchy" of many healthy urban places, with each playing a role complementary to the others. It is reasonable to assume that each of the ten existing urban municipalities and other communities will experience at least a rate of growth which is substantial in relation to its present size, and in some cases the growth would probably be proportionately very rapid indeed.

Secondly, references to a "single" new urban concentration should not be taken to imply that there will never be more than one large urban centre in the Study Area. Realistically, planning must relate to what can reasonably be foreseen within a finite time period. On this basis, it is considered that the urban growth strategy for the Study Area should be based on the selection of a single locality on which development efforts should be focussed for a certain period of time -- perhaps over the next two to three decades. This should in no way be taken to preclude a subsequent

change in emphasis to another locality, depending on the circumstances and needs of the time and on the broader regional planning context.

Thirdly, the use of such terms as "growth point" or "urban concentration" does not necessarily connote a single, compact mass of buildings and streets. (This is the main reason why this report generally avoids the use of the conventional term "new town", which tends to carry that implication.) "Urban concentration" is used in a deliberately general sense to cover a range of possible urban forms, including the compact "new town", the "linear town", a loose pattern of "cluster" developments, or other variants made possible by modern technology.

Underlying all of the foregoing discussion is the assumption that the urban population growth generated by industrial development in Haldimand-Norfolk will in fact take place within the Study Area. This assumption has been questioned, on the basis that some or all of the new residential development could take the form of expansions of Brantford and/or Hamilton. Technically, this would no doubt be feasible, given greatly improved transportation facilities between those cities and the Nanticoke area. Whether or not it would be desirable cannot be assessed within the scope of the Study. All that can be said at this point is that in terms of transportation facilities now in existence and planned, both cities lie beyond the maximum commuting range generally regarded as acceptable (see Section 4(v)), and there is at present no obvious reason to attempt to direct the urban growth generated by industries in Haldimand-Norfolk so far afield. It would appear to involve a deliberate attempt to resist the natural tendency of workers to live within fairly easy reach of their jobs, and would involve the maintenance of rigid controls in the face of continuous strong pressures to permit development closer to the Nanticoke area.

### 3.3 Industrial Growth

The Study has not yet progressed to the point at which firm recommendations regarding future industrial development are possible. However, in view of many current rumours, some of which could well be founded on fact, concerning the imminence of further announcements of major industrial projects, industrial land use policy cannot be ignored, and the following observations may be regarded as useful interim guidelines pending the adoption of firm industrial land use plans.



New industries can be grouped into two general categories. The first comprises those "major" industries which, due to size of employment, volume of traffic generated, generation of pollution, or other factors, are of more than local significance and must be considered in relation to the future growth of the Study Area as a whole. The second category includes "minor" industries, i.e., those whose impact is confined to a single community or small area. At present no specific "performance standards" have been established to differentiate clearly between the two categories, but it is reasonable to assume that the great majority of new industries which may wish to locate within the Study Area in the near future will be readily classified into one or the other.

At least for the present, minor industries can be regarded as falling outside the central concerns of the Haldimand-Norfolk Study and left to be dealt with principally through local official plans and zoning by-laws. However, it is considered advisable as an interim policy at least, and quite possibly as a permanent one, that minor industries should be generally directed either to established communities or to sites immediately adjacent to industries in the first category. In the latter case, they may be able to serve as a suitable "buffer" between pollution-generating industries and existing or future residential areas.

The first category generally includes "large-scale" industries (e.g., Stelco, Texaco) for which Lake Erie is likely to be the main magnet (for transportation, water supply, waste disposal, etc.). Taking into account such factors as accessibility by both lake and land transportation, land costs, etc., the Nanticoke area would appear to be the optimum location in the Study Area for such industries. Furthermore, preliminary studies suggest that most of the remaining lake-shore within the Study Area is either unsuitable for industrial use for various reasons (e.g., physical unsuitability of the land for heavy structures; local microclimatological conditions that would tend to create severe air pollution problems; remoteness from main roads and railways), or has particular value from the recreation/conservation point of view (especially the Long Point-Turkey Point area). This suggests that an interim policy of confining new major industries to the Nanticoke area would be advisable. Generators of air pollution should not be permitted west of the Stelco site, and should in general be confined as closely as possible to the present industrial development (Stelco-Hydro-Texaco) area. Specifically, new sources of air pollution should not be permitted further north than the northern boundaries of the present industrial sites.

It must be stressed that no definitive recommendations are possible at present, and the final plan for Haldimand-Norfolk may well suggest other areas for future large-scale industrial growth (probably subject to specific performance standards). The foregoing guidelines are intended mainly as a "holding operation" as a precaution against the possibility that large industries might in the immediate future seek sites in locations which could turn out to be in conflict with sound area-wide planning.

### 3.4 Agriculture and Recreation

So far, this report has stressed the urban and industrial growth prospects of the Study Area. This emphasis must not be allowed to disguise a crucially important fact: that out of the 718,000 acres of land in Haldimand and Norfolk, urban uses, including industry, will probably need no more than 50,000 acres -- seven per cent (7%) of the total land area -- by the end of this century.

The implications of this fact are obvious. Agriculture will remain an extremely important element both in the use of land and in the economy of the Study Area. While as in the case of industry it is still too early for the Study to produce specific proposals, it is quite clear that the wise use of agricultural land must be a key consideration in long-term planning. Farmlands must not be viewed simply as a stockpile of raw material ultimately to be turned over to the bulldozer, but as an important resource deserving proper management and forethought in their own right. This is not news to the farmer, but it is most important for the future of the entire area and its people -- farmers and towns-men alike -- that the fact should be generally recognised, and accepted as a basic premise (as is not always the case) in developing the plan for the Haldimand-Norfolk area as a whole. Specifically, the agricultural productivity of land should be treated as an important consideration in determining the suitability of the various parts of the area for non-agricultural uses (see below, section 4 (viii)).

Another vitally important fact about the Study Area is that it contains some of Ontario's richest potential recreational resources, made infinitely more precious because, unlike the recreational resources of northern Ontario, they are within easy reach of the province's rapidly growing industrial and urban heartland -- Toronto, Hamilton, the Kitchener-Waterloo area, London. Long Point, Turkey Point and the lower Grand River Valley stand out as potential recreation/conservation features of incalculable future value.

to the entire urban population of central south-western Ontario, but much of the Lake Erie shore (despite the pollution of the lake), Big Creek, and even the smaller streams such as the Lynn, are potentially almost if not quite as important. Once again, no firm recommendations are being made at this time, but it can certainly be said, and said most emphatically, that every possible step should be taken to protect, if not yet to develop, the tremendous natural assets of the Study Area. These natural features, if preserved, offer the possibility of developing, over the course of time, a unique continuous regional system of recreation and conservation areas, linked to other features outside Haldimand-Norfolk (e.g., the Niagara Escarpment, the Bruce Trail, the Niagara Parks system, Otter Creek), providing a very extensive area and a very wide variety of recreational resources.

The main reason for restricting comments on agriculture, recreational resources, conservation and similar subjects to generalities in this report is that the Study does not yet have available the Environmental Appraisal ("Chanasyk Report") which has been commissioned from Professor Chanasyk of the University of Guelph. This is a detailed examination of every major aspect of the natural and physical environment of the Study Area, which will serve as the basis for specific plans for agricultural and recreational land use and related matters, as well as providing invaluable information for the identification of suitable areas for urban and industrial development.

#### 4. Criteria for a New Urban Centre

Although by no means the only important feature of the Haldimand-Norfolk plan, the new urban centre will be in a sense its keystone, since its location will, to a very considerable extent, determine both the future distribution of population among other urban centres in the Study Area, and the planning and timing of major area-wide facilities such as main roads and water and sewage systems. Therefore, the next important step in the Study, and perhaps the most important, will be to arrive at a recommendation on the location of the new centre. Three general areas are now under consideration. It is still premature to identify them, but this section of the report outlines the considerations which were taken into account in selecting them, and which should be the basis of the final choice.

##### (i) Regional Development Strategies

A decision on so important a matter as the location of a large new urban centre affects, and must be affected by, considerations relating not just to a rather narrowly circumscribed area, but to an entire region and even to a complex of regions. Thus, the preliminary selection of the three locations now being considered was based in part on regional and "macro-regional" factors which are outlined in the Provincial Government's statement on "A Strategy for South-Western Ontario Development". Similarly, the final recommendation on the location of the new centre will take into account the development goals established for the Niagara and Lake Erie Economic Regions in Phase I of the Government's Regional Development Program, which will be published by the Department of Treasury and Economics this spring.

##### (ii) Flexibility

In a region and a period of dynamic growth, with very rapid developments in technology (especially transportation) affecting the distribution, size and form of urban centres, it is impossible to predict precisely the emerging pattern of such centres into which the new one in Haldimand-Norfolk will have to fit. Therefore, the growth strategy for the Study Area must be as flexible as possible, and the early stages of large-scale urban development must be so directed that, if possible, they can fit in with a variety of evolving long-term growth patterns. In determining the most suitable location for a new urban centre in the Study Area, consideration must be given to its future relationship to:



- (a) Existing centres within the Study Area and their "natural" growth trends;
- (b) Major existing centres outside the Study Area, particularly Hamilton and Brantford;
- (c) The possible emergence of large new centres outside the Study Area, and where such centres might develop (e.g., in eastern Elgin - related to the future Dofasco plant) or in the central part of the Regional Municipality of Niagara. These are at present no more than possibilities, but as possibilities they cannot be ignored.

(iii) Diversification of Opportunity

Diversification of the economic base and of employment opportunities has already been adduced (in section 3.2) as one of the virtues of concentrating urban growth (the "growth point" principle) as opposed to dispersing it. Much of this value would be lost if the new centre were so located that it would be heavily dominated by a single employer or a single type of industry and were thus to assume something of the character of a "company town". On the contrary, it would be desirable to choose a location which provided residents with as wide as possible a choice of employment opportunities. In this connection, it has to be borne in mind that although Stelco is not the only new source of employment in the Nanticoke area, in terms of numbers (as far as is known at present) it will be overwhelmingly dominant. Even if the new centre could be so located as to serve Dofasco as well as Stelco (which would in any case be very difficult because of the distances involved and the wide gap in the timing of the two projects) it would be even more heavily dominated by a single industry, if not by a single firm.

(iv) The Lakeshore

Attention has already been drawn to the fact that the shores of Lake Erie are both the magnet which will continue to attract industrial growth, and an actual and potential recreational asset of the greatest value to the most heavily populated part of Ontario. Therefore, there are two imperatives for the planning of the lakeshore lands: to ensure that in general they are preserved for uses with "priority" claims; and by careful study to ensure that they are "zoned" and safeguarded primarily for such uses according to suitability. This will mean considering the varied character of the shoreline and the waters along it, as well as

special problems such as erosion.

These general principles must be taken into account in considering whether a large new urban centre should be located on or near the lake, but they do not necessarily preclude such a choice. A lakeshore site has obvious potential advantages in the provision of piped services, and also in the "amenity" value of the lake to the residents -- providing recreation, views, and a cooling effect in summer. The possibility of water transportation (e.g., by hovercraft) might eventually be a significant asset. The main factors in deciding on the choice of part of the lakeshore as the location for a new urban centre would be (a) its suitability in terms of other criteria; (b) the availability of a site which would be compatible with industrial and recreational uses; and (c) careful planning of urban development so that the recreational potential of the shoreline itself would not be either impaired, or monopolised by private owners. With good urban planning, the recreational value of the lakeshore to the public could in fact be greatly enhanced.

Additional principles relating to development on the lakeshore are set out in section G of "A Strategy for South-Western Ontario Development".

#### (v) Transportation

In the light of the long-term regional development possibilities discussed in the statement on "A Strategy for South-Western Ontario Development", it seems highly probable that transportation will be a dominant element in shaping the future growth of the Study Area. It is, in fact, already on an important (railway) transportation corridor between Detroit/Chicago and New York State/New England. Further development of this function seems virtually certain; what is still very uncertain is the way in which this development will take place and just what its impact on the growth pattern of the Study Area will be. For example, it is reasonable to expect that there may one day be some form of high-speed transportation facility from Detroit/Windsor through the Niagara area, probably with a link to Toronto; but at present there is no way of knowing how this may eventually affect the number, size and location of urban centres and industrial districts in the Study Area.

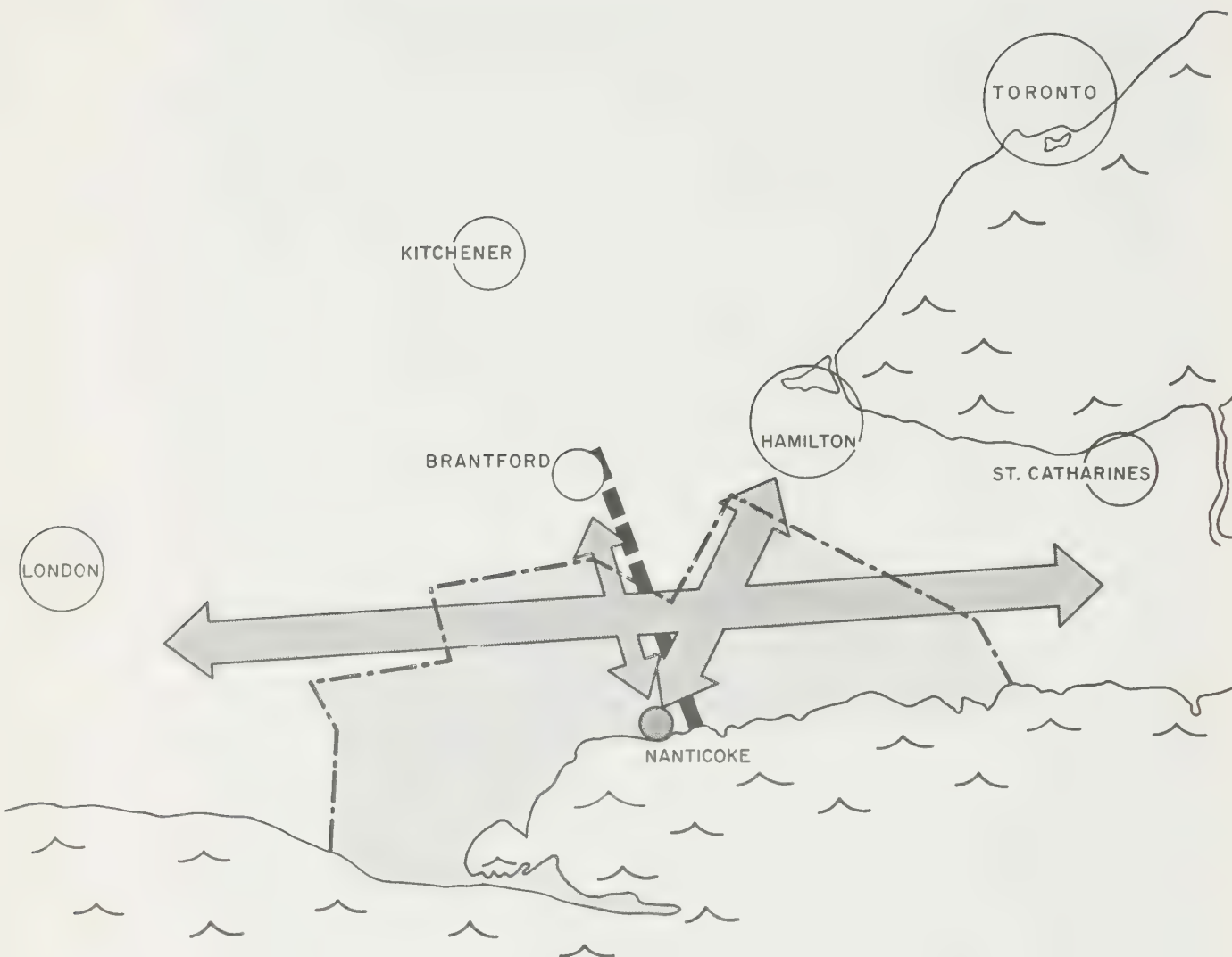
Certain assumptions can, however, be made with a fair degree of confidence. One is that there will sooner or later be a high-capacity transportation facility, probably a freeway, connecting the London and Niagara areas, i.e., roughly parallel to Highway 3. Construction of such a facility at a fairly early stage in the urbanisation and industrialisation of the Study Area would assist greatly in guiding these processes; in other words, contrary to the prac-

tices of the past, the route of a major traffic artery could be planned as an instrument of overall planning policy, to encourage growth in the most suitable locations. A second assumption that can be made with some confidence (though no detailed studies have yet been carried out) is that Highway 6 will eventually have to be replaced with a facility of higher capacity to accommodate growing traffic volumes between Hamilton and the Nanticoke area. An improved connection between the Nanticoke area and Brantford will probably also be essential at some point in the future.

All these considerations may affect, and be affected by, the decision as to the location of a new urban centre. This decision must also, however, take into account the desirability of making the most efficient use possible of the existing road system, and preferably avoiding the creation of heavy concentrations or peaks of traffic that would overstrain present highway capacities. As in any plan, the need for careful coordination of the planning and timing of land use and transportation is paramount in the future growth of the Study Area.

Underlying all the considerations discussed above, however, is the vital limiting factor imposed by transportation facilities on the location of the new centre: commuting time-distance. It is now well established that the maximum length of time which most people are willing to spend travelling to and from their jobs does not much exceed 30 minutes. There are, of course, exceptions, and in certain circumstances workers may be forced into longer commuting times. But the fact remains that the great majority of workers will live within 30-40 minutes' travel time of their jobs if they can. For practical purposes, this should be regarded as the outside limit; most commuters would prefer a substantially shorter journey. It was principally for this reason that neither the expansion of Hamilton and/or Brantford, nor the creation of a single new centre to serve both the Nanticoke and the Port Burwell (Dofasco) areas, was considered to be a feasible approach.

Thus, one of the most important criteria for the location of the new centre is that it be within about 30 minutes' commuting time from the Nanticoke area, preferably less. The linear distance involved will depend, of course, on the transportation facilities available; but the choice of location will have to be determined in the light of the facilities which are in existence or firmly planned at the time, while not excluding consideration of those which might come into existence later.



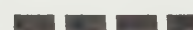
## TRANSPORTATION AND SERVICES



## LEGEND:



Anticipated future travel  
desire lines



O.W.R.C. water pipeline  
(Proposed only)





## (vi) Piped Services

Once the existing communities in the Study Area have reached the limits indicated in section 2, continuing growth will require the construction of new servicing systems. In economic terms, this would normally indicate strongly the concentration of urban growth on or near Lake Erie as both a source of water and a recipient of sewage effluent. However, the Ontario Water Resources Commission already has plans to construct a water pipeline from Lake Erie in the vicinity of Nanticoke to serve Brantford. This would make it possible to supply water inland fairly economically in eastern Norfolk and western Haldimand. The problem of sewage disposal would remain to be resolved. The Grand River might contribute to solving this problem, as a receiving stream for treated sanitary sewage effluent (which could be done without creating additional pollution) but the disposal of storm-water runoff to the Grand would be likely to create erosion problems and ecological disturbance. The servicing of a major new urban area located inland in the central portion of the Study Area, as to both water supply and sewage disposal, would in any case have to be planned with regard to, and in fact in conjunction with, the provision of services to Brantford.

On balance, therefore, a location on or near the lake appears to be most desirable in terms of the provision of services, but further study of this question is still needed.

## (vii) Pollution

In an era when pollution is quite rightly becoming a general source of concern, the quality of air and water must be regarded as a major consideration in determining the location of a large new urban centre. In very general terms, air and water pollution work in opposite ways as locational determinants: that is, the location should be considered principally in terms of the air pollution which it may have to suffer from other sources, but in terms of the water pollution which it will generate itself. However, generation of air pollution by the new urban centre itself could in certain circumstances be significant, and locations where local microclimatological conditions could create problems in this respect should clearly be avoided.

The generation of water pollution is mainly a question of the combination of adequacy of treatment with proper disposal of treated effluent, and has been discussed above (vi). The main point which emerges is that proximity to the

lake or to a high-capacity stream is desirable in terms of cost. However, it should be noted that not all lakeshore locations are equally acceptable, since currents, water depth and other factors affect the dispersion of effluent, and also because of the possible effects of thermal water pollution from industry on a nearby urban centre. This last is still largely an unknown factor, but should not be ignored.

The effect of air pollution on urban growth can be stated more specifically. Residential development is not considered desirable within a ten-mile radius of the Ontario Hydro generating station to the east and north-east. Due to the prevailing wind directions, the acceptable limits are shorter to the west and north, but residential growth closer to Hydro than the existing limits of Port Dover and Jarvis is also regarded as undesirable.

These limits would, of course, probably be extended by the construction of any new industry causing significant air pollution. This is the reason for the suggestion (section 3.3) that no such industry should be permitted to establish itself to the west of the Stelco site.

#### (viii) Use of Agricultural Land

The continuing importance of agriculture in the future of the Study Area has already been emphasized (section 3.4). The tobacco crops of Norfolk make it one of the wealthiest agricultural areas in Canada. Haldimand's mixed farming is less prosperous, but much of the land is considered to be capable of fairly high productivity if properly used. Allegedly, the main problem of agriculture in Ontario at present is over-production. On this basis it may be desirable to withdraw some good farmland from production; but this is not the same thing as making it permanently incapable of production by building on it. To do this unnecessarily would appear to be short-sighted at best. It is not necessary to make a fetish out of the preservation of agricultural land (which has sometimes been done at a cost that makes the policy an economic absurdity) to recognise that, other things being more or less equal, it is wise to choose poor farmland over good for industrial or urban use. In the long run, the land may one day be needed for crop production; in the short run, good land is better able to support an agricultural industry that can remain viable in the face of the economic pressures created by urban and industrial growth. In selecting a location for a new urban centre, therefore, the agricultural quality of the land must be taken into consideration.

(ix) Existing Nucleus or Virgin Site?

An urban concentration with a population of between 100,000 and 150,000 by the end of the century could not possibly be regarded as an "expansion" of any of the existing communities of the Study Area; proportionately, it would be so large as to be in effect a completely new centre, even though the old community might be identifiable as a small part of the new. Nevertheless, there are several arguments in favour of using an existing community as the nucleus around or adjacent to which the new one will grow. Social, retail, community, professional and similar services will be readily available from the beginning, instead of having to be introduced, or provided elsewhere, in the early days of the new development. Human resources -- political leadership, management know-how -- will similarly be available. The identity of an established and known locality may be a useful psychological asset. Costs may be reduced by the availability of local suppliers and services. In time, the "parent" community would have to accept the growing domination of its "child"; the former "downtown", for example, might become merely a neighbourhood centre, since it would be unlikely that it would be sound policy in terms either of urban planning or economics to try to redevelop it to serve a population increased by a factor of perhaps 100. Some redevelopment and replanning would probably be necessary in any case to accommodate the needs of rapid expansion, but this should be regarded as an opportunity rather than a burden.

From the urban planner's viewpoint, there are strong attractions in the opportunity to plan a large new urban centre "from scratch" on a virgin site, but in practice such an opportunity only occurs as a result of a very unusual circumstance. In Haldimand-Norfolk, where new urban growth will be accommodated entirely by existing communities for several years to come and where most of these communities will probably continue to grow rapidly even after the birth of what is to become the dominant urban centre, it would seem sound policy to accelerate the growth momentum of one of them rather than, at some point in time, to divert the mainstream of growth to a totally new location.

The arguments against a virgin site are by no means conclusive. They do not outweigh the many other factors, discussed above, which affect the choice of location. They may be offset by other considerations, such as the cost of land around existing communities. As in the avoidance of good agricultural land, the arguments in favour of grafting the new centre on to an existing community really depend on other considerations being fairly evenly balanced.

\* \* \* \* \*

Of the criteria which have been discussed, two factors -- air pollution and commuting time-distance -- set respectively the approximate inner and outer limits of the zone in which not only the main urban concentration, but also most other urban growth related to the Nanticoke industrial area, should be located. Within this zone, the remaining criteria do not by any means point consistently to any one particular location as being obviously "right" for the new urban centre. Of the three locations which are being studied, each has advantages and disadvantages in terms of the various factors which have been discussed. Much importance in the final selection will therefore attach, not only to more detailed information, but also the "weighting", or relative importance, ascribed to each factor. Here, the Haldimand-Norfolk Joint Study Committee, the municipal councils, the planning boards, the organisations and the people of the Study Area can contribute very effectively to the making of the decision, by expressing their views as to the relative importance of each factor.



TABLE 1

## EMPLOYMENT AND LABOUR FORCE

No.	Ref.	(1) 1966	1971	1976	1981	1986	1991	1996	2001
1	(2+3 +4)	24,400	28,700	33,675	43,675	56,500	74,650	82,150	93,350
2	Employment Total (excl. Dofasco)								
3	Agriculture	10,800	10,500	10,200	9,800	9,500	9,300	9,000	8,700
4	Basic Industries <sup>(2)</sup>	6,100	6,400	8,475	13,175	18,750	26,250	29,150	33,650
5	Non-Basic Industries	7,500	11,800	15,000	20,700	28,250	39,100	44,000	51,000
6	Construction (Industrial)	--	3,200	3,300	2,500	2,000	2,000	2,000	2,000
7	Other <sup>(3)</sup>	7,500	8,600	11,700	18,200	26,250	37,100	42,000	49,000
8	Unemployed	1,000	500	300	600	1,000	1,200	1,500	2,000
9	Out-Commuters	4,300	3,500	2,500	3,000	4,000	5,000	6,000	7,000
10	In-Commuters	--	1,500	2,500	5,000	6,500	8,000	9,000	10,000
	Labour Force <sup>(4)</sup> (excl. Dofasco)	(1+7 +8 - 9 )	29,700	31,200	33,975	42,275	51,000	72,850	92,350

Continued on Page 24

TABLE 1 - EMPLOYMENT AND LABOUR FORCE (continued)

No.	Ref.	(1)							
		1966	1971	1976	1981	1986	1991	1996	2001
10 Labour Force (4) (excl. Dofasco)	(1+7+8 +9)	29,700	31,200	33,975	42,275	51,000	72,850	80,650	92,350
11 Employment - (5) Dofasco							1,000	4,000	9,000
12 Non-Basic Industries due to (6) Dofasco							3,200	4,100	7,800
13 OVERALL LABOUR FORCE	(10 +11 +12)	29,700	31,200	33,975	42,275	51,000	77,050	88,750	109,150
14 Labour Force Added in Five Years			1,500	2,775	8,300	8,725	26,050	11,700	20,400

- (1) Estimates based on Industrial Survey (Department of Economics and Development, Trade and Industry Branch) and surveys of the Department of Municipal Affairs, Community Planning Branch.
- (2) Basic industries include Ontario Hydro, Stelco, Texaco and other major industries.
- (3) Other non-basic industries were calculated according to a multiplier formula which results in growing significance of this sector with growing community sizes. This includes service industries, trade, finance, institutions, etc.
- (4) Labour force refers to residents in the area working (or looking for work) either inside, or outside of its boundaries.
- (5) For the purpose of this report the full impact of Dofasco was assumed to fall on the Study Area in its early stages of development.
- (6) Non-basic industries due to Dofasco include construction as well as other industries generated.

TABLE 2

## POPULATION AND HOUSEHOLDS

PART A - LABOUR FORCE MULTIPLIER<sup>(1)</sup>

No.	Ref.	(2) 1966	1971	1976	1981	1986	1991	1996	2001
15		1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
16		76	76	77	78	77	76	75	74
17	(15 x 16)	760	760	770	780	770	760	750	740
18		3.5	3.5	3.5	3.5	3.4	3.4	3.3	3.3
19	(17 x 18)	2,660	2,660	2,700	2,730	2,620	2,580	2,480	2,440
20		54	50	60	70	80	100	120	150
21	(19 + 20)	2,714	2,710	2,760	2,800	2,700	2,680	2,600	2,590
22	LABOUR FORCE MULTIPLIER (1)	2.71	2.71	2.76	2.80	2.70	2.68	2.60	2.59

Continued on Page 26

TABLE 2 - POPULATION AND HOUSEHOLDS (continued)

## PART B - POPULATION

No.	Ref.	(2) 1966	1971	1976	1981	1986	1991	1996	2001
23	Overall Labour Force (13)	29,700	31,200	33,975	42,275	51,000	77,050	88,750	109,150
24	Labour Force (1) Multiplier (22)	2.71	2.71	2.76	2.80	2.70	2.68	2.60	2.59
25	POPULATION (23x24)	80,598	84,550	93,770	118,370	137,700	206,500	230,750	282,900
26	Farm	22,193	21,000	20,500	20,000	19,000	18,000	17,000	16,000
27	Non-Farm (rural)	28,047	Some increase to	be expected	-----	-----	-----	-----	-----
28	Non-Farm (urban)	30,358	63,550	73,270	98,370	118,700	188,500	213,750	266,900

## PART C - HOUSEHOLDS

29	Persons per Household	3.5	3.5	3.5	3.5	3.4	3.4	3.3	3.3
30	No. of Non-Farm Households (27+28) x29	16,700	18,150	21,550	28,100	34,900	55,440	64,700	81,000
31	Non-Farm Households Added		1,450	3,400	6,550	6,800	20,540	9,330	16,230
32	Average Yearly Addition of Non-Farm Households		290	680	1,310	1,360	4,100	1,870	3,250

(1) This multiplier indicates the average potential of a member of the labour force to "support" further population.

(2) Source: DBS Census, 1966 - published figures, or calculations based on published figures.



TABLE 3  
GROWTH CAPACITIES OF URBAN MUNICIPALITIES  
September 30, 1969.

Municipality	1968 Population	Additional population permitted by:			Total Population: Servicing (3) Ceiling	
		Official Plan/ Zoning	Water <sup>(1)</sup>	Sewers <sup>(1)</sup> Present Services (net) (1,2)		
Caledonia	2,944	2,300	0	1,206	0	3,000
Cayuga	1,039	400	500	800	500	
Delhi	3,696	3,300	1,000	0	0	3,700
Dunnville	5,729	3,300	0	1,271	0	
Hagersville	2,222	2,300	-- (4)	300	300	2,600
Jarvis	861	0	1,100	500	500	1,500
Port Dover	3,288	0	2,400	11,700	2,400	
Port Rowan	841	0	2,900	0	0	
Simcoe	10,138	10,900	11,900	0	0	20,000
Waterford	2,460	0	2,500	0	0	2,500
TOTAL		22,500			3,700	

(1) Takes into consideration existing services; existing services with minor improvements; works planned or under construction.

(2) Lower figure from the two previous columns.

(3) Maximum total population (approximately) permitted by the capacity of present water source, and/or receiving stream presently used for sewage effluent.

(4) Indefinite, but substantial.

TABLE 4

## LAND USE (2)

No.		Units	1966 (3)	1971	1981	1991	2001
1	Population Total	No.	80,598	84,550	118,370	206,500	282,900
2	Total Land (Haldimand & Norfolk Counties)	Acres	718,080	718,080	718,080	718,080	718,080
3	Urban Land (Towns & Villages)	Acres	9,232	19,340	25,000	39,000	46,800
4		%	(1.3)	(2.7)	(3.5)	(5.4)	(6.5)
5	Residential	Acres	3,172	3,800	5,000	10,000	12,000
6	Net Residential Density (1)	Persons/ res. acre	18	20	25	30	35
7	Industrial	Acres	500	11,000	12,000	13,000	15,000
8	Commercial	Acres	300	440	600	1,200	1,500
9	Institutional	Acres	360	400	500	1,000	1,200
10	Roads	Acres	2,300	2,500	3,000	6,000	8,000
11	Recreational	Acres	600	700	900	1,800	2,100
12	Vacant	Acres	2,000	500	3,000	6,000	7,000
13	Farms (incl. residential)	Acres	601,952 (83.8%)	?	?	?	?
14	Recreational - public	Acres	106,896 (14.9%)	?	?	?	?
15	Cottages - private						
16	Highways, Railroads, etc.						
17	Unimproved						

(1) Changed densities applied to additional population only.

(2) Land use classes include actual and intended uses.

(3) Estimates only.











3 1761 11547544 4